

Copeland Creek Enhancement and Restoration Project: Detention and Recharge Basins  
Sonoma County Water Agency

Proposition 1E Funded Project Elements

*Monitoring, Assessment, and Performance Measures*

**Storm Water Detention/Recharge Basins**

*Monitoring approaches for assessing effectiveness of the basins for flood hazard reduction will include: (1) monitoring of stream flows utilizing an existing USGS flow gauge located along the project reach of Copeland Creek; (2) monitoring of stream and basin stage gauges to be installed as part of the project; and (3) utilizing project construction and monitored gauge data to enhance the development and calibrated accuracy of an existing HEC-RAS model for Copeland Creek to validate project performance (and enhance predictive capabilities of the model).*

*Monitoring approaches for assessing groundwater recharge as part of the project will include: (1) monitoring of groundwater levels and temperature from shallow streambank piezometers to be constructed in the project area; (2) monitoring of groundwater levels and temperature from monitoring wells to be constructed at the project site; (3) evaluation of publicly available groundwater-level data collected and reported for nearby water wells; and (4) estimating the amount of groundwater recharge using a fully coupled surface water/groundwater flow model under development by the U.S. Geological Survey for the Santa Rosa Plain Groundwater Basin.*

**Habitat Enhancement/Restoration**

*Program Monitoring*

*The Sonoma County Water Agency would propose conducting some validation monitoring to track changes in instream habitat, fisheries use, wildlife (avian) use, as well as tracking changes in invertebrate populations. Many of the methods the Sonoma County Water Agency proposes to use are detailed in Copeland Creek Restoration Project Monitoring Plan (Sonoma County Water Agency, 2001).*

*Specifically for this Project, the Sonoma County Water Agency proposes to conduct fish sampling and habitat assessment following methodologies detailed in California Salmonid Stream Habitat Restoration Manual. Avian use will be assessed following Point Reyes Bird Observatory (PRBO) methodologies. The Sonoma County Water Agency proposes to measure canopy development as a primary indicator of Project success by collecting line intersect cover data at established and representative locations along the project site. To monitor water temperature, the Sonoma County Water Agency will install temperature sensors (Hobos) and compare the results to historic Hobo data collected along the reach to evaluate temperature conditions following implementation of habitat restoration. The Sonoma County Water Agency proposes conducting some validation monitoring to track changes in instream habitat as well as tracking changes in invertebrate populations. See Figure 2 for the approximate number and locations of proposed environmental monitoring.*

### *Monitoring, Assessment, and Performance Measures*

*Some aspects of the water quality element of the project could be calculated from measured pollutant loads in the system from nearby streets. The future Phase 2 Municipal Storm Water (MS4) Permit is anticipated to require additional water quality monitoring. Consequently, the City of Rohnert Park may begin collecting such water quality data under a new permit. In the event that this monitoring does occur, we will use the monitoring data to try to correlate changes in water quality with riparian enhancement/restoration.*

### Project Performance Measures Table

**Project Title:** Copeland Creek Enhancement and Restoration Project: Detention and Recharge Basins

- **Category of Project Work Tasks\*:** Planning, Research, Monitoring and Assessment

A	B	C	D	E	F
Project Goals	Desired Outcomes	Output Indicators	Outcome Indicators	Measurement Tools and Methods	Targets
Provide adequate flood protection and channel conveyance capacity and conserve and enhance native salmonid populations by protecting and restoring required habitats, water quality, and watershed processes	Complete design, environmental documents, and construction for storm water detention of up to 200 acre-feet in two to three off-stream basins located in the alluvial fan east of Petaluma Hill Road	Consultant Contracts Bid-Ready Design Documents Approved Environmental Documents Permits Construction Contracts	Design and Environmental Review completed; Permits issued by regulatory agencies; construction contract awarded	Document completion Construction completion	Approval of completed design and environmental documents by project partners, SCWA Board of directors, and regulatory agencies. Issuance of permits Award and completion of construction contract

**Project Performance Measures Table****Project Title:** \_ Copeland Creek Enhancement and Restoration Project: Detention and Recharge Basins**Category of Project Work Tasks\*:** \_ Education, Outreach, and Capacity-building \_

A	B	C	D	E	F
Project Goals	Desired Outcomes	Output Indicators	Outcome Indicators	Measurement Tools and Methods	Targets
Provide Educational and Career Building Opportunities	<p>Increased environmental awareness of residents of Rohnert Park/Cotati for the importance, function and significance of streams and riparian corridors.</p> <p>Employ education and career skill building focused Youth Providers to assist with work (including but not limited to, Conservation Corps North Bay (CCNB), , SCAYD-Sonoma County Adult Youth Development, The Center for Social and Environmental Stewardship)</p>	<p>Number of participants</p> <p>Number of involved schools</p> <p>Number of involved youth providers</p>	Number of participants	<p>Number of participants completing environmental program with CCNB</p> <p>Number of students utilized</p> <p>Number of workshop or group meetings and number of participants</p> <p>Opinion surveys</p>	<p>Employ a dedicated CCNB crew for duration of Project</p> <p>Employ summer youth environmental work programs for duration of Project (approximately 50 students for six weeks each summer over the duration of the Project)</p>

## Project Performance Measures Table

**Project Title:** Copeland Creek Enhancement and Restoration Project: Detention and Recharge Basins

• **Category of Project Work Tasks\*:** Flood Attenuation and Floodplain Protection

A	B	C	D	E	F
Project Goals	Desired Outcomes	Output Indicators	Outcome Indicators	Measurement Tools and Methods	Targets
Provide adequate flood protection and channel conveyance capacity and conserve and enhance native salmonid populations by protecting and restoring required habitats, water quality, and watershed processes	Reduce flooding within and around the City of Rohnert Park and the lower Copeland Creek watershed	<ol style="list-style-type: none"> <li>Depth, duration and geographic extent of flood inundation.</li> <li>Number of inundated properties and structures</li> <li>Miles and duration of impacted streets and transportation corridors</li> </ol>	<ol style="list-style-type: none"> <li>Reduced flood inundation of:               <ol style="list-style-type: none"> <li>Building structures</li> <li>Parcels</li> <li>Streets and transportation corridors</li> <li>Total acreage</li> </ol> </li> <li>Elimination of channel breakout flows downstream of Petaluma Hill Road to the Laguna De Santa Rosa</li> </ol>	<ol style="list-style-type: none"> <li>Stream flow and stage monitoring</li> <li>Flood damage/response assessments</li> <li></li> </ol>	<ol style="list-style-type: none"> <li>Provide adequate detention storage and channel conveyance capacity to convey and contain storm water runoff from the 100-year (1%) recurrence storm event within the Copeland Creek channel through the City of Rohnert Park to the Laguna De Santa Rosa.</li> <li>Maintain the Copeland Creek Hydraulic Grade Line (HGL) for the 10-year (10%) recurrence interval storm event below the original channel design HGL.</li> </ol>

## Project Performance Measures Table

**Project Title:** The Copeland Creek Watershed Storm Water Detention, Groundwater Recharge, Habitat Restoration, and Steelhead Refugia Project

• **Category of Project Work Tasks\*:** Water Conservation, Supply Reliability Enhancement, and Recycling

A	B	C	D	E	F
Project Goals	Desired Outcomes	Output Indicators	Outcome Indicators	Measurement Tools and Methods	Targets
Ensure adequate water supply while minimizing environmental impacts (Subsequent Phase of project).	Sustain and Enhance local groundwater recharge	<ol style="list-style-type: none"> <li>1. Increasing or sustaining local groundwater levels</li> <li>2. Amount of increased baseflow in Copeland Creek</li> <li>3. Number of acres protected to provide natural and enhanced groundwater recharge</li> </ol>	<ol style="list-style-type: none"> <li>1. Acre-feet of subsurface storage increase in the project area</li> <li>2. Percent of groundwater recharge areas restored and/or protected in watershed.</li> <li>3. Increase in water availability for environmental restoration and enhancement</li> </ol>	<ol style="list-style-type: none"> <li>1. Monitoring of groundwater levels from piezometers and monitoring wells to be constructed in the project area</li> <li>2. Evaluation of groundwater-level data collected and reported for nearby water wells</li> <li>3. Monitoring of water-surface elevation data from staff gauges to be installed in each retention pond</li> <li>4. Coupled surface water/groundwater flow modeling using USGS GSFLOW model</li> <li>5. Evaluation of percentage of suitable groundwater recharge areas for Laguna de Santa Rosa Watershed represented by project area using recharge layers generated by USGS study of the Santa Rosa Plain Groundwater Basin</li> </ol>	<ol style="list-style-type: none"> <li>1. Increase of 150 acre-feet per year in groundwater recharge</li> <li>2. Stable or increasing groundwater levels</li> <li>3. Increase baseflow in alluvial reach of Copeland Creek by 75 acre-feet per year</li> <li>4. Protect and enhance 5% of high potential natural groundwater recharge areas within the Copeland Creek Watershed</li> </ol>

## Project Performance Measures Table

**Project Title:** Copeland Creek Enhancement and Restoration Project: Detention and Recharge Basins

• **Category of Project Work Tasks\*:** Water Quality

A	B	C	D	E	F
Project Goals	Desired Outcomes	Output Indicators	Outcome Indicators	Measurement Tools and Methods	Targets
Improve surface water quality along length of implemented Project	-Reduced suspended sediment -Reduce or preserve current water temperatures -Support populations of invertebrates that are indicators of good water quality - reduce nutrient and pollutants entering the channel	Implement phytoremediation techniques (vegetated buffers) at storm flow stream inlets Increase native instream graminods density and cover	Percent reduction of pollutants, sediment, and nutrients discharged to waterbody Percent reduction in number of days TMDL targets are exceeded	Implement a water quality sampling plan for Project phases that tracks influent, effluent, and receiving waters concentrations of TMDL targets	TMDL achievement for sediment and nutrients Measurable reduction in sediment, pollutants, nutrients and sediment leaving the Project Area Compliance with SMP Programmatic Waste Discharge Requirements/ Water Quality Certification
Improve surface water quality flowing into the Laguna de Santa Rosa	-Reduced suspended sediment -Reduce or preserve current water temperatures -Support populations of invertebrates that are indicators of good water quality -reduce nutrient and pollutants entering the channel	Implement phytoremediation techniques (vegetated buffers) at storm flow stream inlets Increase native instream graminods density and cover	Percent reduction of pollutants, sediment, and nutrients discharged to waterbody	Implement a water quality sampling plan for Project phases that tracks influent, effluent, and receiving waters concentrations of TMDL targets	TMDL achievement for sediment and nutrients Compliance with SMP Programmatic Waste Discharge Requirements/ Water Quality Certification

## Project Performance Measures Table

**Project Title:** Copeland Creek Enhancement and Restoration Project: Detention and Recharge Basins

- **Category of Project Work Tasks\*:** Load Reduction

A	B	C	D	E	F
Project Goals	Desired Outcomes	Output Indicators	Outcome Indicators	Measurement Tools and Methods	Targets
<p>Reduce quantity of in channel sediment to reduce frequency of need to implement in-channel sediment removal activities.</p> <p>Develop focused offstream sediment collection within the detention/recharge basins.</p>	<ul style="list-style-type: none"> <li>• Maintain hydraulic capacity to reduce impacts of 100 year storm</li> <li>• Establish offstream sediment collection within the detention/recharge basins</li> </ul>	<ul style="list-style-type: none"> <li>• Reduction in needed frequency of in-channel sediment removal</li> <li>• Reduction in volume of sediment removed from lower reaches</li> </ul>	<ul style="list-style-type: none"> <li>• Frequency of needed in-channel sediment removal</li> <li>• Flooding frequency</li> </ul>	<ul style="list-style-type: none"> <li>• Sonoma County Water Agency Stream Maintenance Manual</li> <li>• Implementation, monitoring and maintenance Reports</li> <li>• GIS maps</li> <li>• Field measurements</li> <li>• Purchase invoices</li> <li>• Stream gage data</li> <li>• Volume measurements (truck loads)</li> <li>• Photography</li> </ul>	<ul style="list-style-type: none"> <li>• Sediment collects in focused detention/recharge basins for easy annual removal</li> </ul>

<b>Project Performance Measures Table</b> <b>Project Title:</b> _ Copeland Creek Enhancement and Restoration Project: Detention and Recharge Basins <b>Category of Project Work Tasks*:</b> _ Habitat Restoration					
A	B	C	D	E	F
Project Goals	Desired Outcomes	Output Indicators	Outcome Indicators	Measurement Tools and Methods	Targets
Restore and enhance approximately 10 acres of riparian habitat along 6,600 linear feet of Copeland Creek	<ul style="list-style-type: none"> <li>Enhancement and restoration of approximately 10 acres of riparian habitat along 6,600 linear feet of Copeland Creek.</li> <li>Improve quantity and quality of habitat available for native wildlife</li> </ul>	<ul style="list-style-type: none"> <li>Number of native plants installed</li> <li>Acres of habitat enhanced or restored</li> <li>Acres converted to riparian habitat</li> </ul>	<ul style="list-style-type: none"> <li>Plant survival</li> <li>Acres restored or enhanced</li> <li>Area and volume of exotic species removed</li> </ul>	<ul style="list-style-type: none"> <li>Sonoma County Water Agency Stream Maintenance Manual</li> <li>Implementation, monitoring and maintenance Reports</li> <li>GIS maps</li> <li>Field measurements</li> <li>Purchase invoices</li> <li>Stream stage gage</li> <li>Volume measurements (truck loads)</li> <li>Photography</li> <li>Vegetative cover sampling (line intercept, quadrat or point)</li> </ul>	<ul style="list-style-type: none"> <li>50% increase in native riparian habitat</li> <li>75% survival of installed plants</li> </ul>
Improve quantity and quality of instream aquatic habitat for the benefit of native warm and cold water fisheries	<ul style="list-style-type: none"> <li>Increased instream complexity</li> <li>Improved fish passage at low flows</li> <li>Improved migratory conditions</li> </ul>	<ul style="list-style-type: none"> <li>Invertebrate fauna</li> </ul> <p>Stream condition to support fisheries</p>	<ul style="list-style-type: none"> <li>Salmonid in and out migration conditions</li> <li>Shift in invertebrate species composition toward improved water quality</li> </ul>	<ul style="list-style-type: none"> <li>Sonoma County Water Agency Stream Maintenance Manual</li> <li>Implementation, monitoring and maintenance Reports</li> <li>GIS maps</li> <li>Field measurements</li> <li>Stream gage data</li> <li>Photography</li> <li>California Rapid Assessment Methods for Wetlands</li> </ul>	<ul style="list-style-type: none"> <li>Shift (improvement) in invertebrate species composition</li> <li>Improvement of passage and out migration conditions for salmonids</li> </ul>

**Project Performance Measures Table****Project Title:** Copeland Creek Enhancement and Restoration Project: Detention and Recharge Basins

- **Category of Project Work Tasks\*:** Habitat Restoration

A	B	C	D	E	F
Project Goals	Desired Outcomes	Output Indicators	Outcome Indicators	Measurement Tools and Methods	Targets
				<ul style="list-style-type: none"><li>• DFG Salmonid Habitat Restoration Manual- Habitat Inventory Methods and Project Evaluation and Monitoring</li></ul>	